THE POTENCY OF TREES IN SUPPORTING HYDROLOGICAL SYSTEM PERFORMANCE

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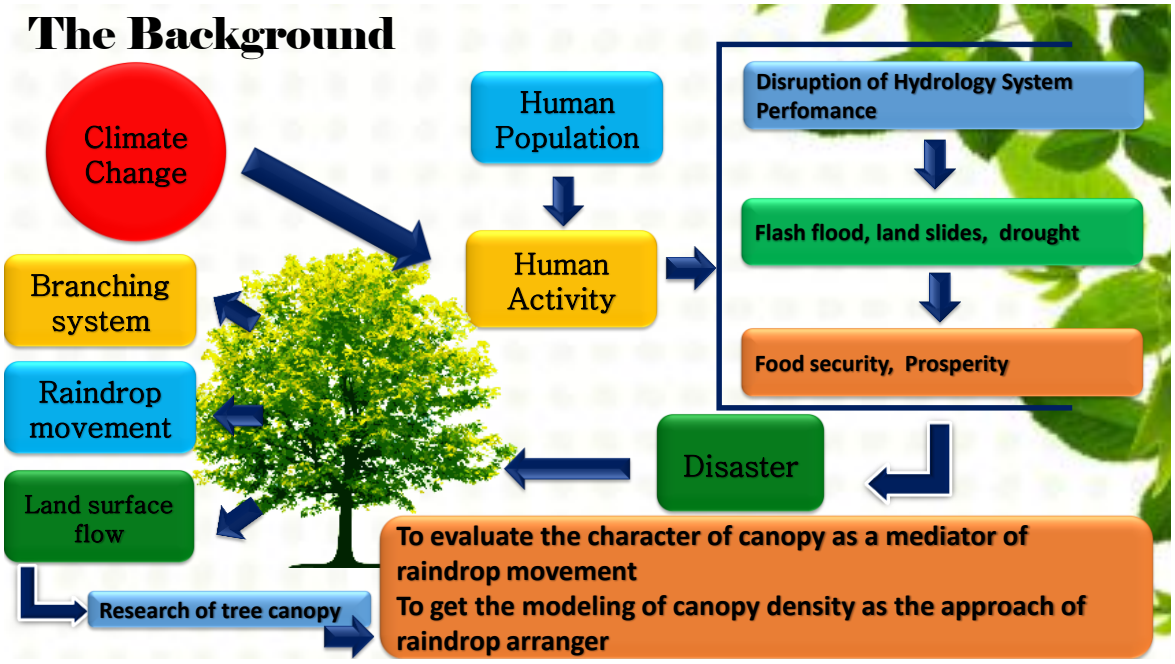
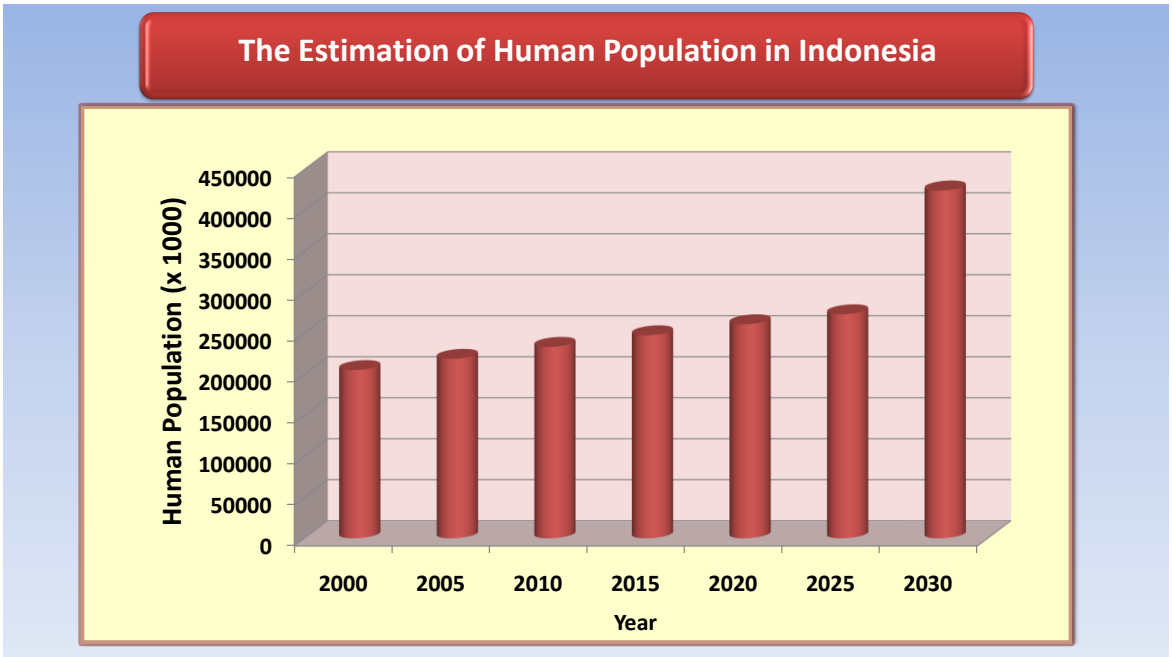
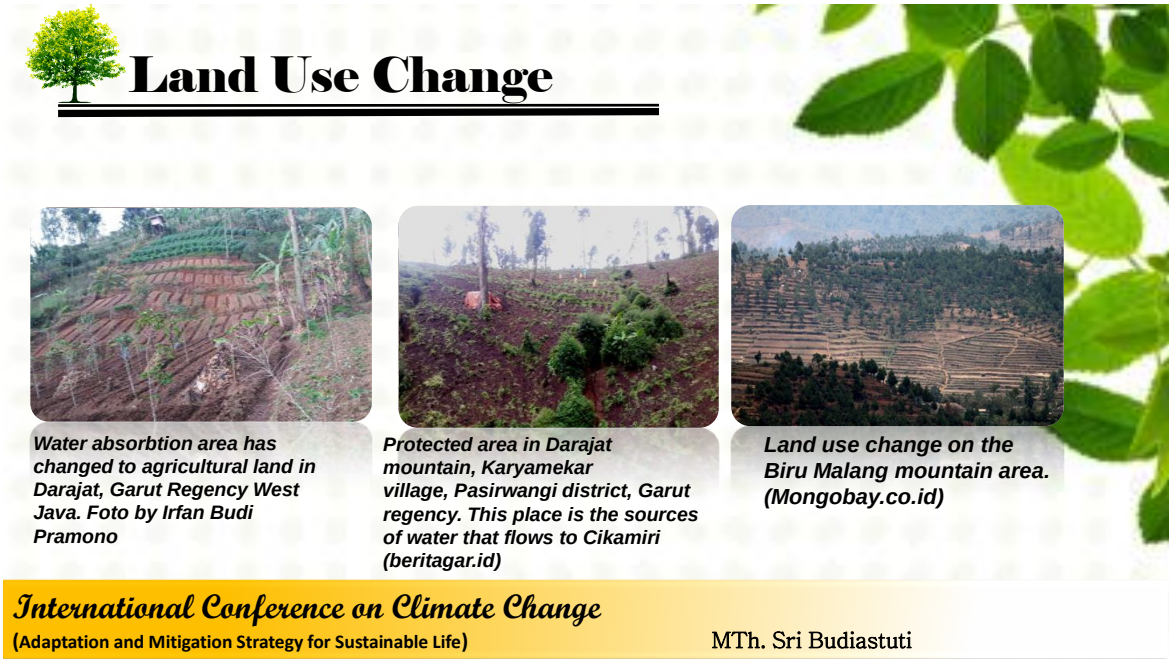



The Estimation of Human Population in Indonesia
Human Population (x 1000)
450000
400000
350000
300000
250000
200000
150000
100000
50000
0
2000
2005
2010
2015
2020
2025
2030
Year


Land Use Change
Water absorbtion area has changed to agricultural land in Darajat, Garut Regency West Java. Foto by Irfan Budi Pramono
Protected area in Darajat mountain, Karyamekar village, Pasirwangi district, Garut regency. This place is the sources of water that flows to Cikamiri (beritagar.id)
Land use change on the Biru Malang mountain area. (Mongobay.co.id)
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Land Use Change

The impact of deforestration in Central Kalimantan. Picture by Greenpeace

Deforestration in Kutai Kartanegara Regency , Forest has been changed to plantation. Picture by compas

Palm plantation on the upstrem of Limboto Lake, Bongomeme Picture by Christopel Paino (Mongabay.co.id)

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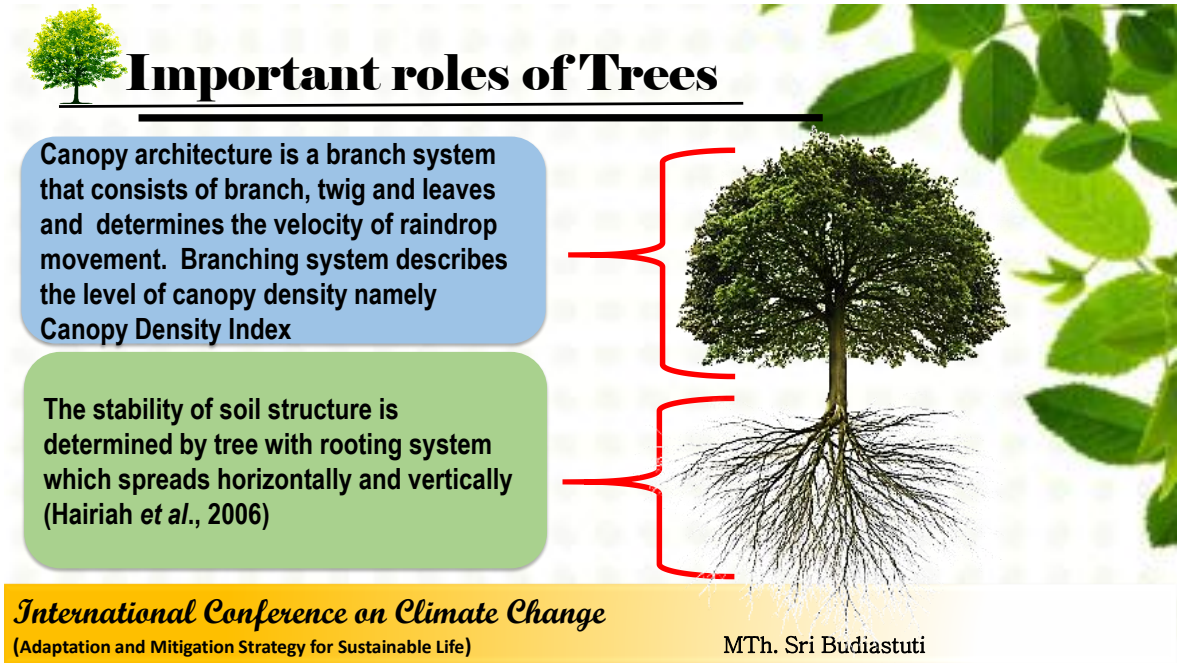
Disruption of agricutural production

Drought in Padangpariaman West of Sumatera (antaranews.com).

Flooded in Paddy field (Cisaga district , Ciamis regency, on Sunday, October 9th 2016)


Important roles of Trees
Canopy architecture is a branch system that consists of branch, twig and leaves and determines the velocity of raindrop movement. Branching system describes the level of canopy density namely Canopy Density Index
The stability of soil structure is determined by tree with rooting system which spreads horizontally and vertically (Hairiah et al., 2006)
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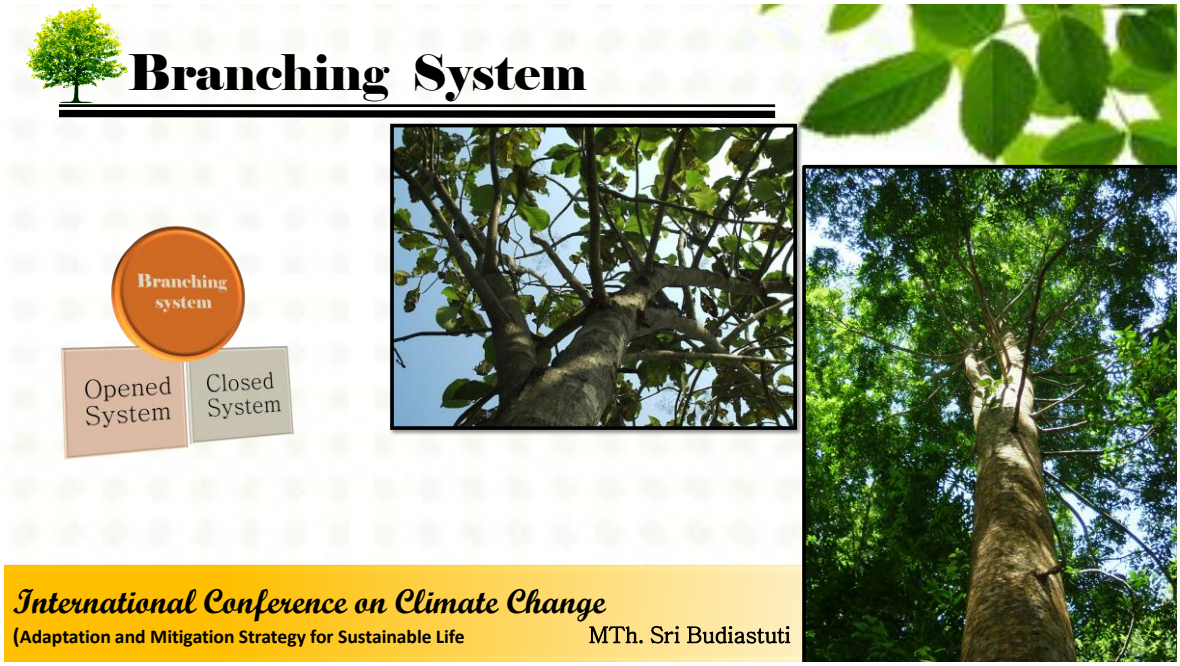
Branching System
Branching system
Opened System
Closed System
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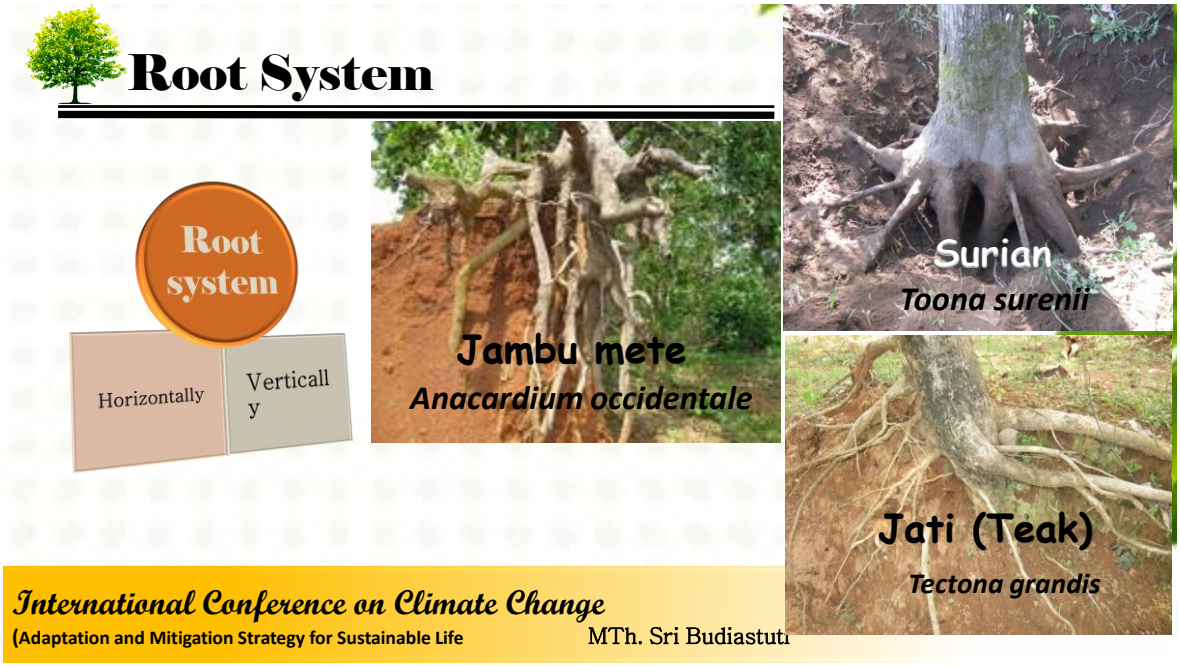
Root System
Root system
Horizontally
Verticall y
Jambu mete
Anacardium occidentale
Surian
Toona surenii
Jati (Teak)
Tectona grandis
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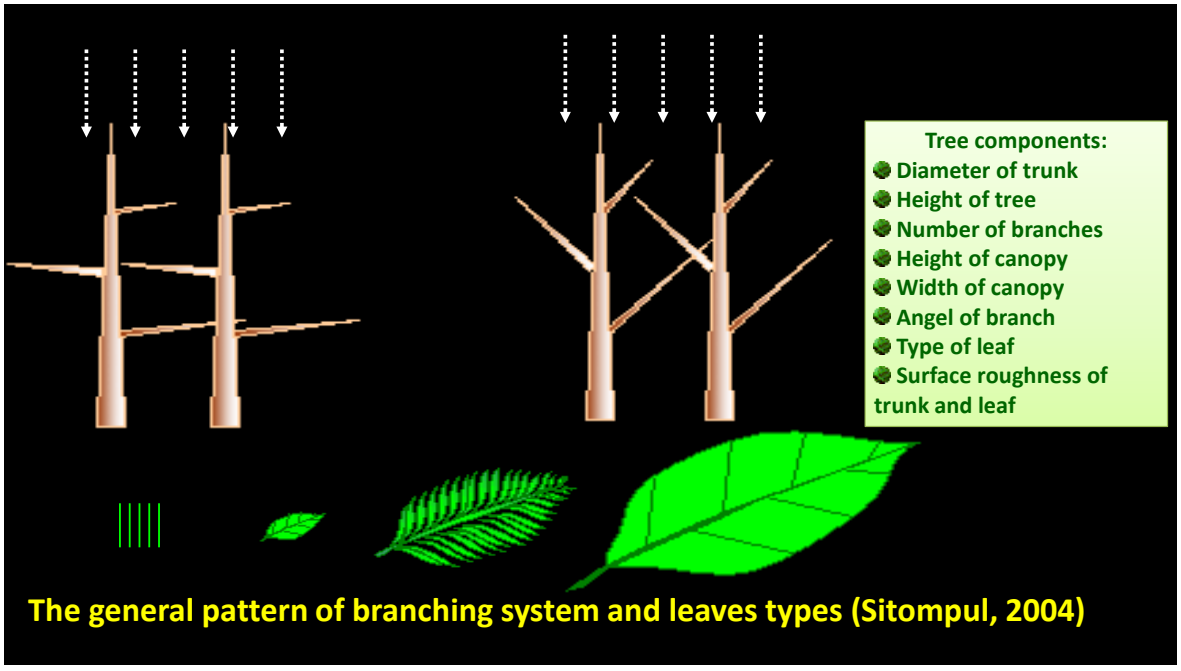
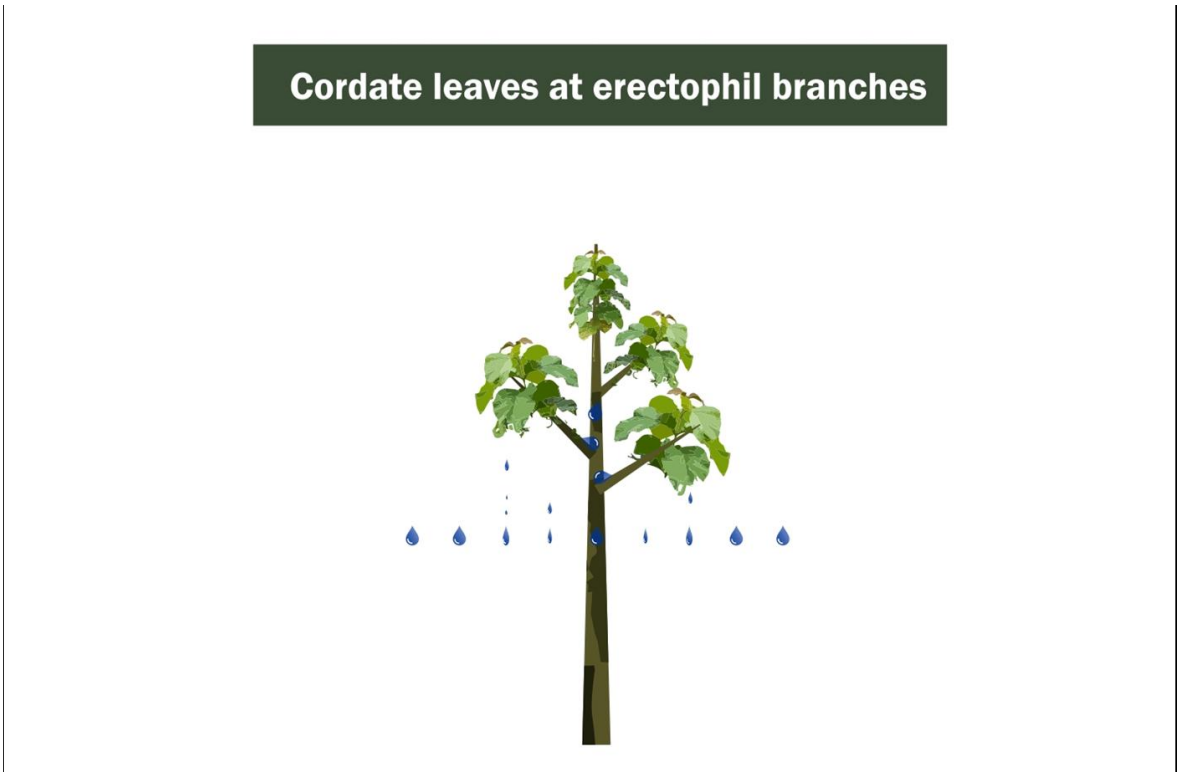
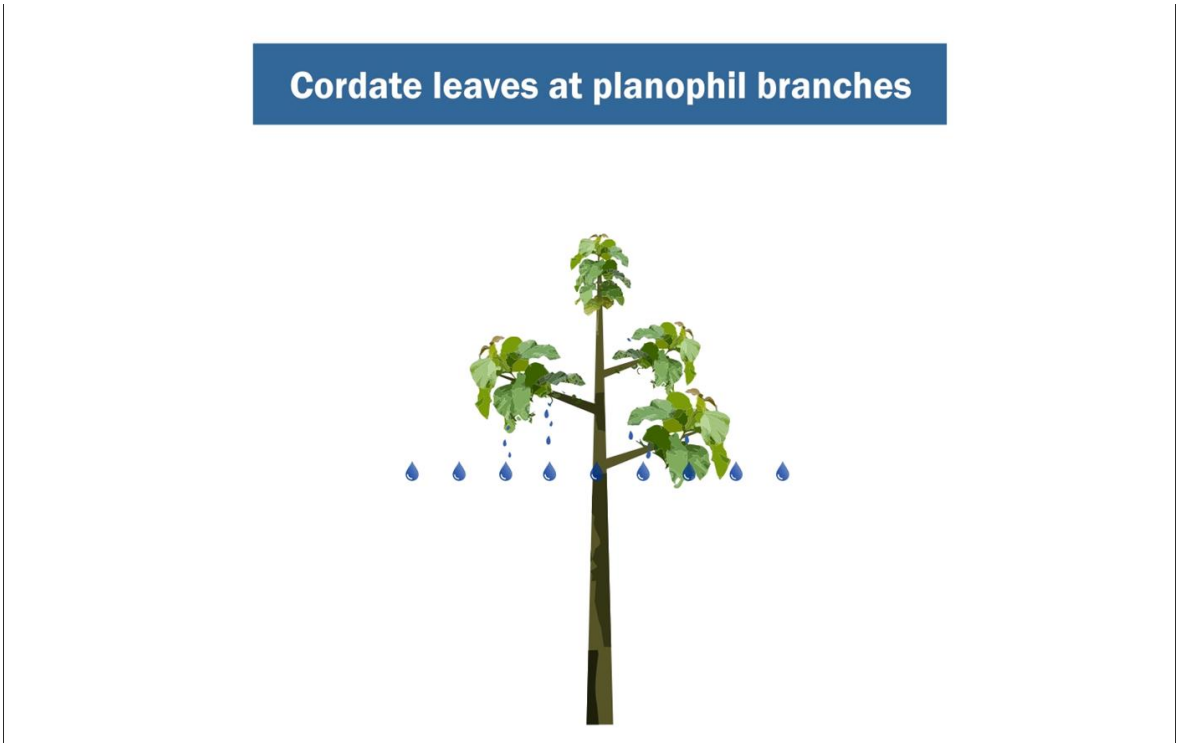
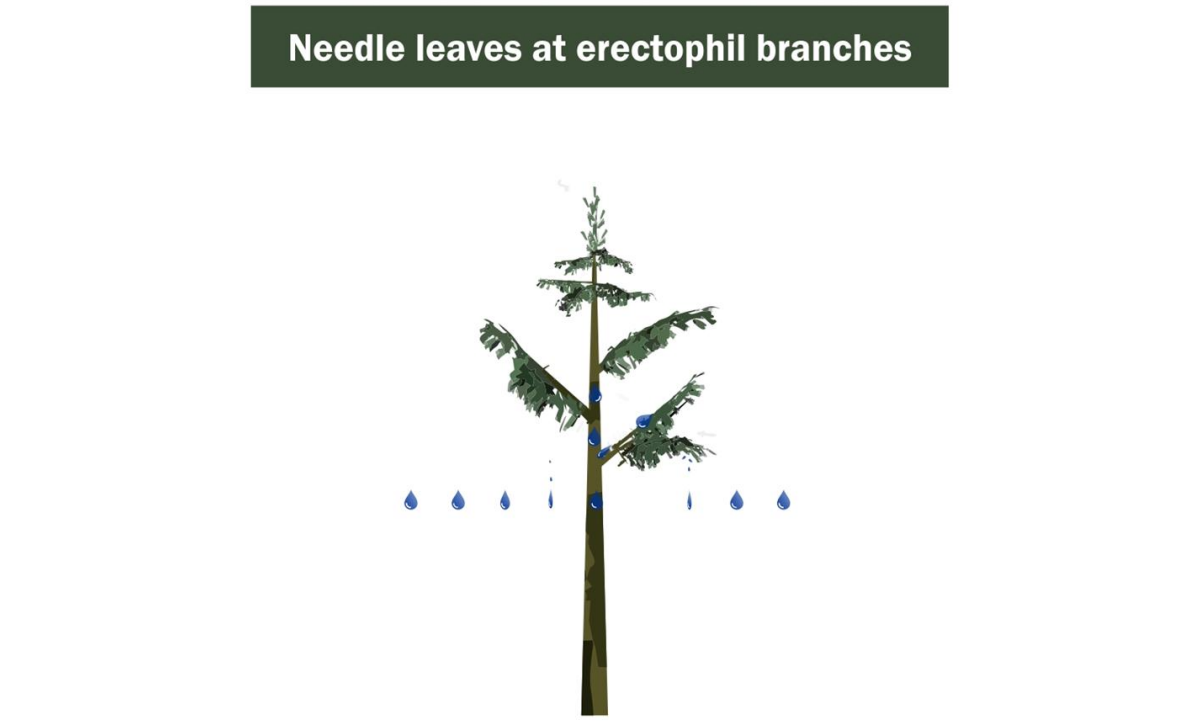

Tree components:
Diameter of trunk
Height of tree
Number of branches
Height of canopy
Width of canopy
Angel of branch
Type of leaf
Surface roughness of trunk and leaf
The general pattern of branching system and leaves types (Sitompul, 2004)


CORDATE ERECTOPHIL.ppsx
CORDATE LEAVES AT ERECTOPHIL BRANCHES
CORDATE PLANOPHIL.ppsx
CORDATE LEAVES AT PLANOPHIL BRANCHES
NEEDLE ERECTOPHIL.ppsx
NEEDLE LEAVES AT ERECTOPHIL BRANCHES
NEEDLEPLANOPHIL.ppsx
NEEDLE LEAVES AT PLANOPHIL BRANCHES


Cordate leaves at erectophil branches


Cordate leaves at planophil branches


Needle leaves at erectophil branches

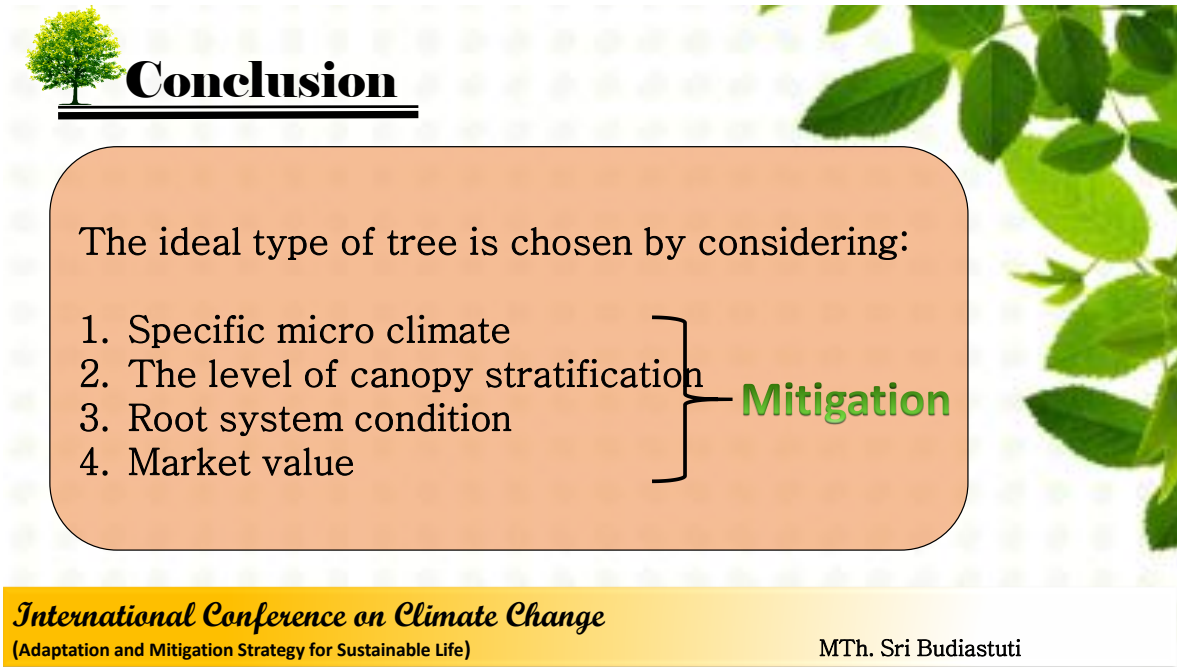
Needle leaves at planophil branches

Canopy Density Index (CDI):

$$CDI = -\left(k \frac{3\xi}{\pi h^2 w^2} \right)$$

(Budiastuti, 2007)

k = constanta is based on relation between through fall (mm) with rainfall (mm)
ξ = number of branches (unit/tree)
π = 3.14
h = height of canopy(m)
w = width of canopy (m)


Conclusion
The ideal type of tree is chosen by considering:
1. Specific micro climate
2. The level of canopy stratification
3. Root system condition
4. Market value
Mitigation
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